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10/531,417	06/02/2005	Toshiyuki Morii	P27750	7983

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EXAMINER	
LERNER, MARTIN	
ART UNIT	**PAPER NUMBER**
2626	

NOTIFICATION DATE	DELIVERY MODE
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

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Office Action Summary	Application No.	Applicant(s)	
	10/531,417	MORII, TOSHIYUKI	
	Examiner	Art Unit	
	MARTIN LERNER	2626	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE _3_ MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on _22 January 2008_.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) _1 to 10_ is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) _1 to 10_ is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on _22 January 2008_ is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.

4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .

5) ☐ Notice of Informal Patent Application

6) ☐ Other: _____.

DETAILED ACTION

Drawings

1. Replacement drawings were received on 22 January 2008. These drawings are acceptable.

Claim Rejections - 35 USC § 102

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

3. Claims 1, 3, 4, 9, and 10 are rejected under 35 U.S.C. 102(b) as being anticipated by *Yasunaga et al.*

Regarding independent claim 1, *Yasunaga et al.* discloses a method of coding speech, comprising:

"associating an excitation waveform vector of a predetermined channel with a waveform number of an excitation vector waveform candidate of another channel, or an operation result of a numerical value used to acquire the waveform number" – an excitation vector generator has a fixed waveform storage section 181 for storing three fixed waveforms v1, v2, and v3 of channels CH1, CH2, and CH3 ("an excitation vector waveform candidate of a predetermined channel"); fixed waveforms v1, v2, and v3 are

stored in advance in the fixed waveform storage section 181, and fixed waveform arranging section 182 reads out fixed waveforms v1, v2, and v3 from fixed waveform storage section 181 (column 32, lines 5 to 26: Figure 18); fixed waveform v1 is arranged at start position P1 selected from start position candidates for CH1, fixed waveform v2 is arranged at start position P2 for CH2, and fixed waveform v3 is arranged at start position P3 for CH3, as shown in Table 8; code numbers correspond, one to one, to a combination of selectable start position candidates of the individual fixed waveforms (column 32, lines 17 to 48: Figure 18: Table 8); broadly, fixed waveform v1 ("an excitation waveform vector of a predetermined channel") "associates" with fixed waveform v2 and fixed waveform v3 at start positions P1, P2, and P3 by an ordered array ("a waveform number of an excitation waveform candidate of another channel"), in one to one correspondence, as shown by Table 8; that is, a first pulse position 0 of fixed waveform v1 is associated with a first pulse position 2 of waveform v2 and a first pulse position 4 of waveform v3, second pulse position 10 of waveform v1 is associated with second pulse position 12 of waveform v2 and second pulse position 14 of waveform v3, etc.

"searching for an excitation vector waveform that minimizes coding distortion using the associated excitation vector waveform candidate of the predetermined channel and the excitation vector waveform candidate of another channel" – generally, a CELP type speech coder carries out an excitation vector search in an adaptive codebook 14 and a random codebook 15 to minimize a coding distortion (column 1, lines 32 to 55: Figure 1); specifically, a fixed waveform v1 is read from a fixed waveform

storage section 181A, at a position p1 selected from start position candidates for CH1, based on start position candidate information for fixed waveforms shown in Table 8, and likewise arranges the fixed waveforms v2 and v3 at respective positions P2 and P3 selected from start positions candidates CH2 and CH3; the arranged fixed waveforms are sent to the adding section 183A and added to become an excitation vector c; synthesis filter 194 synthesizes the excitation vector c, and sends it to distortion calculator 205; distortion calculator 205 computes a distortion of every combination of start position candidates from fixed waveform arranging section 182A, and finds the combination of start position candidates that minimizes the coding distortion; that combination of start position candidates is selected (column 34, lines 7 to 37: Figures 18 and 19A);

"determining a code of the excitation vector of the stochastic codebook using a code of the excitation vector waveform obtained by searching" – a combination of the start position candidates that minimizes the coding distortion is selected, and the code number which corresponds, one to one, to that combination of start position candidates is transmitted to the transmitter 196 (column 34, lines 32 to 37: Figures 18 and 19A); implicitly, the terms "fixed codebook", "random codebook", "noise codebook", and "stochastic codebook" are all synonymous in a CELP type speech coder.

Regarding claim 3, *Yasunaga et al.* discloses a CELP type speech coder (Abstract), where the excitation information is used as a random codebook in a speech

coder/decoder (column 32, lines 57 to 59); a stochastic codebook is known to be an equivalent term to a random codebook for speech coding by CELP.

Regarding claim 4, *Yasunaga et al.* discloses a CELP type speech coder (Abstract), where the excitation vector is provided from an algebraic codebook (column 62, lines 51 to 52; column 63, lines 18 to 19; column 65, lines 15 to 17; column 65, lines 29 to 31; column 66, lines 9 to 10).

Regarding claim 9 and 10, *Yasunaga et al.* discloses a random codebook for a CELP type speech coder/decoder (Abstract), and produces an excitation code vector (column 32, lines 5 to 14: Figure 18).

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

5. Claim 2 is rejected under 35 U.S.C. 103(a) as being unpatentable over *Yasunaga et al.* in view of *Mitsubishi (JP '097)*.

Yasunaga et al. searches for an excitation vector from random codebooks by a search algorithm, but does not expressly disclose a search algorithm of n-fold loops, where n is a number of channels, that changes an excitation vector waveform candidate within a loop in accordance with an excitation vector waveform candidate outside the loop. However, *Mitsubishi (JP '097)* teaches a method of voice encoding by CELP,

where excitation vectors are selected by searching for vectors that have a minimum difference between an input voice signal and a synthesized voice signal. Specifically, a noise excitation vector is composed of four pulses, and a search is made sequentially by a quadruple loop of a 1st loop <LOOP1N> to a 4th loop <LOOP4N>. (Abstract) Thus, a 1st loop determines a first pulse, a 2nd loop determines a second pulse, a 3rd loop determines a third pulse, and a 4th loop determines a fourth pulse, where results of the inner loops are affected by the results of the outer loops. One skilled in the art would recognize that an algorithm executed as a series of nested loops would be an effective iterative process for synthesizing an excitation vector of a speech coder because an objective is to minimize a difference between an input voice signal and a voice signal synthesized from the excitation vectors. It would have been obvious to one having ordinary skill in the art to produce the three fixed waveforms, corresponding to the three channels, of *Yasunaga et al.* by a search algorithm of nested loops as taught by *Mitsubishi (JP '097)* for a purpose of achieving an effective procedure for minimizing a difference between an input voice signal and a voice signal synthesized from excitation vectors.

6. Claims 5 to 8 are rejected under 35 U.S.C. 103(a) as being unpatentable over *Yasunaga et al.* in view of *Miseki et al.*

Yasunaga et al. omits a coding method involving a remainder operation result for associating an excitation vector waveform candidate of a predetermined channel with an excitation vector waveform candidate of another channel, where the remainder

operation result is associated with a pulse position, an index of a pulse position, or by addition of remainder operation results.

However, *Miseki et al.* teaches a CELP scheme for coding speech, where a pre-selecting section 212 for a noise codebook 100 uses a function L(p, n) = n mod p, which involves a remainder obtained by dividing n by p. That is, L(p, n) is a remainder obtained from a mod function. The remainder function L(p, n) is used to group elements having a same polarity, and partial inner products f_k are obtained by calculating inner products between only elements k which satisfy the remainder function, k = n mod p. The sum of the absolute values of the partial inner products f_k are calculated for the elements satisfying k = n mod p, and an evaluating section 303 arranges sums cor(i) in order of magnitude. Indexes J of the noise codebook are selected based on magnitude as pre-selection outputs. The pre-selection of an index for a vector having a corrected shape can be performed by searching for the maximum values of the sums cor(i) obtained from remainder function, k = n mod p. (Column 17, Lines 25 to 67: Figure 7). Thus, the grouping, or "association", of elements is in accordance with a remainder function, indexes J, and a sum, or "addition", cor(i). Moreover, one skilled in the art can readily see that the elements of the noise codebook are "pulses", implicitly, because they are described by polarity and positions. Indeed, *Yasunaga et al.* expressly states that the random codebook produces an excitation vector that is coded with a pulse sequence. (Column 3, Lines 52 to 56; Column 3, Line 65 to Column 4, Line 4; Column 4, Lines 46 to 61) *Miseki et al.* suggests objectives of performing a high speed index search even if the number of bits is large to obtain excellent quantization performance.

(Column 3, Lines 45 to 61) It would have been obvious to one having ordinary skill in the art to perform a remainder operation, and an addition of remainder operation results, to select an index of a pulse position as taught by *Miseki et al.* in a CELP type speech coder of *Yasunaga et al.* for a purpose of performing a high speed index search with excellent quantization performance.

Response to Arguments

7. Applicant's arguments filed 22 January 2008 have been fully considered but they are not persuasive.

Firstly, it is noted that Applicant has amended claims 5 to 8, which were previously indicated to be allowable if rewritten into independent form. However, Applicant's amendment has significantly changed the scope of these claims, by deleting an association by a multiplication operation result, and inserting an operation result being a remainder operation, with antecedent basis being provided by amended independent claim 1. Applicant's amendment has necessitated a new grounds for rejection of claims 5 to 8, as now being obvious over *Yasunaga et al.* in view of *Miseki et al.* The new grounds of rejection are necessitated by Applicant's amendment because *Miseki et al.* teaches a remainder operation.

Secondly, Applicant's traversal of the rejection of 35 U.S.C. §101 is persuasive. The USPTO has recently revised its standard for rejections of non-statutory subject matter under 35 U.S.C. §101.

Thirdly, Applicant argues that *Yasunaga et al.* fails to anticipate independent claim 1, as amended, because the prior art does not disclose or reasonably suggest associating of an excitation vector waveform candidate of a predetermined channel with a waveform number of an excitation vector waveform candidate of another channel, or an operation result of a numerical value used to acquire the waveform number. This position is not persuasive.

Yasunaga et al. discloses at least the alternative of associating an excitation vector waveform candidate of a predetermined channel with a waveform number of an excitation vector waveform candidate of another channel. Basically, the concept of "associating" is broad, and is being broadly interpreted. Table 8 of *Yasunaga et al.* shows how the fixed waveforms v1, v2, and v3 stored in fixed waveform storage section 181 for three channels CH1, CH2, and CH3 are associated by start position. Thus, there are three "excitation vector waveform candidates" v1, v2, and v3. Each of excitation vector waveform candidates v1, v2, and v3 has a code number, or "waveform number", corresponding to combination information of selectable start positions. (Column 32, Lines 15 to 48) Broadly, then, there is an "association" of start positions of the three fixed waveforms v1, v2, and v3 because the code number of one waveform is associated with a start position of each waveform in combination with another waveform. That is, the code numbers describe a start position for each waveform of one channel with respect to each other waveform of another channel. The waveforms are "associated" by their relative start positions.

Moreover, *Yasunaga et al.* discloses the elements of searching and determining a code, as set forth by independent claim 1. Generally, a CELP type speech coder carries out an excitation vector search in an adaptive codebook 14 and a random codebook 15 to minimize a coding distortion. (Column 1, Lines 32 to 55: Figure 1)

Specifically, *Yasunaga et al.* discloses an excitation vector search for finding an optimum start position candidate, where a fixed waveform v1 is read from a fixed waveform storage section 181A, at a position p1 selected from start position candidates for CH1, based on start position candidate information for fixed waveforms shown in Table 8, and likewise arranges the fixed waveforms v2 and v3 at respective positions P2 and P3 selected from start positions candidates CH2 and CH3. The arranged fixed waveforms are sent to the adding section 183A and added to become an excitation vector c. Then, synthesis filter 194 synthesizes the excitation vector c, and sends it to distortion calculator 205. The distortion calculator 205 computes a distortion of every combination of start position candidates from fixed waveform arranging section 182A, and finds the combination of start position candidates that minimizes the coding distortion. That combination of start position candidates is selected. (Column 34, Lines 7 to 37: Figures 18 and 19A) A combination of the start position candidates that minimizes the coding distortion is selected, and the code number which corresponds, one to one, to that combination of start position candidates is transmitted to the transmitter 196. (Column 34, Lines 32 to 37: Figures 18 and 19A) Thus, *Yasunaga et al.* discloses searching for an excitation vector that minimizes the distortion from vectors

in a plurality of channels, and determining a code of the excitation vector, which is transmitted.

Therefore, the rejections of claims 1, 3, 4, 9, and 10 under 35 U.S.C. §102(b) as being anticipated by *Yasunaga et al.*, of claim 2 under 35 U.S.C. §103(a) as being unpatentable over *Yasunaga et al.* in view of *Mitsubishi (JP '097)*, and of claims 5 to 8 under 35 U.S.C. §103(a) as being unpatentable over *Yasunaga et al.* in view of *Miseki et al.*, are proper.

Conclusion

8. Applicant's amendment necessitated the new grounds of rejection presented in this Office Action. Accordingly, **THIS ACTION IS MADE FINAL.** See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Martin Lerner whose telephone number is (571) 272-7608. The examiner can normally be reached on 8:30 AM to 6:00 PM Monday to Thursday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David R. Hudspeth can be reached on (571) 272-7843. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Martin Lerner/
Primary Examiner, Art Unit 2626
March 13, 2008